

Frequently Asked Questions In-Use Off-Road Diesel Vehicle Regulation

Credit for Installing VDECS
January 2013

Q – How would installing a diesel particulate filter help me comply with the off-road regulation?

A – As amended in 2011, the off-road regulation no longer mandates the installation of verified diesel emission control strategies (VDECS), which include exhaust retrofits such as diesel particulate filters. Fleets still have the option to install particulate matter (PM) and oxides of nitrogen (NOx) VDECS as part of their overall compliance strategy, however. For more information on VDECS, see ARB's Frequently Asked Questions (FAQs) document in the Off-Road Regulation Knowledge Center at <http://www.arb.ca.gov/msprog/ordiesel/documents/vdecs/vdecsfaq.pdf>.

At times, fleets may find that installation of VDECS may be the lowest cost compliance option to meet either the fleet average targets (the fleet average a fleet must meet in a compliance year) or the annual best available control technology (BACT) requirements. By installing highest level PM VDECS by certain early credit deadlines (detailed below), fleets can earn double credit and be able to exempt vehicles from turnover requirements for the life of the regulation.

Q – How would installing a VDECS change my fleet average, and what BACT credit could I earn? Can I get double credit? If so, what are the relevant deadlines?

A – Installing a VDECS verified to reduce PM will help lower a fleet's fleet average index and help a fleet meet its fleet average targets. Changes to a fleet average depend on the PM Level of the VDECS and whether or not the VDECS also achieves NOx reductions. VDECS are categorized by the level of verified emissions that will be reduced: a level 1 VDECS will achieve at least 25% emission reductions; Level 2, at least 50% reductions; and Level 3 at least 85% reductions. The higher the PM reduction level, the more it can help the fleet average. Verified NOx reductions in addition to PM reductions can help the fleet average even more.

An installed VDECS on a vehicle lowers a fleet's overall fleet average index as shown in the equation below:

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Fleet average index = [SUM of (Max hp x Emission factor x VDECS Factor for each engine in fleet) for all engines in fleet] divided by [SUM of (Max hp) for all engines in fleet]

The VDECS Factor is used to adjust down the vehicle's emission factor and lower the fleet average index, per the equation above. As shown in **Table 1** below, the VDECS Factor varies depending on the level of PM VDECS and whether the VDECS is also verified to reduce NOx. A Level 3 PM VDECS, for example, lowers a vehicle's emission factor by 30 percent (because it has a VDECS Factor of 0.7).

Table 1: VDECS Factor

VDECS	VDECS Factor
No VDECS Installed or Level 1 VDECS	1
Level 2 PM VDECS, not Highest level	0.82
Level 2 PM VDECS, not Highest level, with NOx Reduction	1 Minus (0.18 + (Verified Percent NOx Reduction divided by 170))
Highest Level PM VDECS	0.7
Highest Level PM VDECS with NOx Reduction	1 Minus (0.3 + (Verified Percent NOx Reduction divided by 170))
NOx Reduction only	1 Minus (Verified Percent NOx Reduction divided by 170)

In addition to lowering a fleet's fleet average, installing a VDECS provides a fleet with BACT credit. By installing a VDECS prior to the early credit deadlines shown in **Table 2** below, a fleet can receive double credit for installing a VDECS. For example, a medium fleet installing a Level 3 VDECS in 2015 on a 100 hp engine would receive 200 hp BACT credit (instead of receiving the typical credit equal to the horsepower of the engine), which then can be used to help meet the fleet's annual BACT requirements in a later year. The same fleet installing a level 2 PM VDECS (not highest level) that is verified to achieve 30% NOx reductions on a 100 hp engine in 2015 would receive 100 hp BACT credit; the same fleet installing a VDECS not verified to achieve PM reductions but verified to achieve 30% NOx reductions on the same engine in 2015 would receive 50 hp BACT credit. On or after the early credit deadlines in **Table 2**, fleets are eligible to receive single BACT credit for each VDECS installed VDECS, as summarized in **Table 3**. For example, if the medium fleet described above waits until 2016 to install a Level 3 VDECS on its 100 hp engine, it would receive 100 hp BACT credit.

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Table 2: Double Credit for Early VDECS Installations 2249.1(b)(15)

Early VDECS (Double Credit)	< 1/1/13 (Large)	Highest level PM = 2 x hp
	< 1/1/16 (Medium)	NOx + PM (not highest level) = 2 x (NOx % ÷ 60%) x hp
	< 1/1/18 (Small)	NOx + highest level PM = 2 x (NOx % ÷ 120%) x hp

Table 3: BACT Credit earned for PM VDECS and NOx VDECS 2449.1(b) (10)

VDECS	Highest Level PM	hp of engine retrofitted
	NOx + PM (not highest level)	(% NOx reduction ÷ 60%) x hp of engine retrofitted
	NOx + Highest Level PM ¹	(% NOx reduction ÷ 120%) x hp of engine retrofitted

Q - What if a VDECS is purchased before the double credit deadline but not installed until after that deadline?

A - If a VDECS is ordered, but not installed, by the double credit deadline (January 1, 2013 for large fleets, January 1, 2016 for medium fleets, and January 1, 2018 for small fleets), the fleet will still receive double credit. However, there must be a written contract between the manufacturer and the fleet by applicable deadlines for the purchase of the VDECS, and the VDECS must be installed immediately upon receipt.

Q – Can installing VDECS help me avoid future requirements to turn over vehicles?

A – First, as detailed above, if a fleet installs VDECS, its fleet average index (overall emission rate) is lowered. This will help a fleet move closer to meeting its annual fleet average target. Once a fleet meets that target, it is in compliance and would not be required to take further action for that year, including having to turn over any vehicles.

Second, as described above, installing VDECS earns a fleet BACT credits, which can satisfy a fleet's annual BACT requirements. For example, if the medium fleet mentioned above receives 200 hp for installing a VDECS early, it can use that 200 hp in a later compliance year in lieu of turning over 200 hp.

¹ Applied in addition to credit for highest level PM VDECS.

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Finally, upon installing a highest level PM VDECS ² on a vehicle, the fleet can then exempt that vehicle from the off-road regulation's turnover requirements. If a highest level PM VDECS ³ is installed on a vehicle after January 1, 2013, that vehicle is temporarily exempt from the BACT turnover requirements for six years. If the highest level PM VDECS was installed prior to January 1, 2013, the exemption from BACT turnover requirements is permanent for the first 15 percent of a fleet's total horsepower. The remainder of vehicles in the fleet with early VDECS installed would receive the six-year exemption.

Q – What happens to my credits if I sell a vehicle that has been retrofitted with a VDECS?

A – As stated, a fleet can generate BACT credit by retrofitting a vehicle with a VDECS. This credit stays with that fleet until they use the credit to meet future BACT requirements, even if the fleet subsequently sells the vehicle, irrespective of whether the vehicle is sold with or without the VDECS installed. If the vehicle is sold with the VDECS still installed, the credit is not transferred to the vehicle buyer, but the buyer will still benefit from the lowered NOx emission factor of the installed VDECS.

Example: A large fleet (Fleet A) installed a VDECS on their 400 hp excavator in 2012. The fleet earned 800 hp in BACT credit for installing the VDECS prior to 2013. Additionally, the VDECS factor was added to Fleet A's fleet average index calculation, reducing the fleet's overall fleet average. The fleet used the 800 hp of BACT credit to meet their compliance requirement on January 1, 2014. Fleet A subsequently sold the excavator, with the VDECS still installed, to Fleet B in February 2015. Fleet B does not earn any BACT credit, as only the fleet that installed the VDECS (Fleet A) was eligible for the credit. However, the VDECS factor will now be included in Fleet B's (not Fleet A's) fleet average index calculations, resulting in a reduced fleet average for Fleet B.

² Highest level VDECS means the highest level PM VDECS verified by ARB to reduce PM. A Level 3 is higher than a Level 2.

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